Amendments to the Specification:

Please replace the paragraph beginning at page 2, line 15, with the following redlined paragraph (or section):

In some encoders such as those specified in the AC-3 standard, the frequency domain transformation of signals is perfomed by the modified discrete cosine transform (MDCT). If directly implemented, the MDCT requires $O(N^2)$ additions and multiplications. However it has been found possible to reduce the number of required operations significantly if the MDCT equation is able to be computed in a ~~from~~ form that is amenable to the use of the well know Fast Fourier Transform (FFT) method of J.W. Cooley and J.W. Tukey (1960). Moreover, using a single FFT for two channels can result in greater reduction in computational requirements of the system.

Please replace the paragraph beginning at page 10, line 1, with the following redlined paragraph:

Therefore we can rewrite the term T_1 as

$$T_1 = \sum_{n=0}^{n=N-1} x[n] * \left(e^{j\alpha} + e^{-j\alpha}\right)/2 = 1/2\left(\sum_{n=0}^{n=N-1} x[n] * e^{j\alpha} + \sum_{n=0}^{n=N-1} x[n] * e^{-j\alpha}\right) \quad \text{Eq. 8}$$

$$= 1/2\left(A_1 + A_2\right)$$

where $A_1 = \sum_{n=0}^{n=N-1} x[n] * e^{j\alpha}$ and $A_2 = \sum_{n=0}^{n=N-1} x[n] * e^{-j\alpha}$

Similarly

$$T_2 = \sum_{n=0}^{n=N-1} x[n] * \left(e^{j\alpha} - e^{-j\alpha}\right)/2j = 1/2j\left(\sum_{n=0}^{n=N-1} x[n] * e^{j\alpha} - \sum_{n=0}^{n=N-1} x[n] * e^{-j\alpha}\right) \quad \text{Eq. 9}$$

$$= 1/2j\left(A_1 + A_2\right)$$

Please replace the paragraph beginning at page 11, line 1 with the following redlined paragraph:

The complex term ~~$G_k = g_{k,r} + g_{k,i}$~~ $G_k = g_{k,r} + jg_{k,i}$, where $g_{k,r}$ and $g_{k,i} \in \Re$ (set of real numbers) in Eq. 12 is essentially the same as F_k in Eq. 2. Therefore the FFT approach can be used to evaluate G_k. This brings down computation from $O(N^2)$ to $O(N\log N)$. Similarly, the second term A_2 in Eq. 8 and Eq. 9 can be evaluated

$$A_2 = \sum_{n=0}^{n=N-1} x[n] * e^{-j\alpha(n,k)} = e^{-j\pi(k+1/2)/N} * \sum_{n=0}^{n=N-1} \left(x[n] * e^{-j\pi n/N}\right) * e^{-j2\pi nk/N}$$

$$= e^{-j\pi(k+1/2)/N} * G_k^*$$

Eq. 13

where $G_k^* = * \sum_{n=0}^{n=N-1} \left(x[n] * e^{-j\pi n/N}\right) * e^{-j2\pi nk/N}$

Note that G_k^* is actually the complex conjugate of G_k which was obtained by Eq. 12. That is, if ~~$G_k = g_{k,r} + g_{k,i}$~~ $G_k = g_{k,r} + jg_{k,i}$, where $g_{k,r}$ and $g_{k,i} \in \Re$ as defined earlier, then $G_k^* = g_{k,r} - jg_{k,i}$. Therefore G_k^* in Eq. 13 does not need to be computed again, and the result from Eq. 12 can be re-used. That is, only one FFT needs to be computed for the evaluation of T_l. The result of Eq. 8 to Eq. 13 is thus

$$T_1 = 1/2\left(e^{j\pi(k+1/2)/N} G_k + e^{-j\pi(k+1/2)/N} G_k^*\right) \qquad \text{Eq. 14}$$

Please replace the paragraph beginning at page 12, line 1 with the following redlined paragraph:

$$X_k = \cos\gamma(k) 1/2\left(e^{j\pi(k+1/2)/N} G_k + e^{-j\pi(k+1/2)/N} G_k^*\right)$$
$$- \sin\gamma(k) 1/2\, j\left(e^{j\pi(k+1/2)/N} G_k - e^{-j\pi(k+1/2)/N} G_k^*\right)$$
$$= \cos\gamma * \left(g_{k,r}\cos(\pi(k+1/2)/N) - g_{k,i}\sin(\pi(k+1/2)/N)\right)$$
$$- \sin\gamma * \left(g_{k,r}\sin(\pi(k+1/2)/N) + g_{k,i}\cos(\pi(k+1/2)/N)\right)$$
$$= \cos\gamma * T_1 - \sin\gamma * T_2 \qquad \text{Eq. 16}$$

The term $G_k = g_{k,r} + jg_{k,i}$ is computed in $O(N\log N)$ operation by use of FFT algorithms. The additional operation outlined in Eq. 16 to extract the final X_k is only of order $O(N)$. Therefore the MDCT can now be computed in $O(N\log_2 N)$ time. The operations required to obtain the MDCT are illustrated in Fig. 3.

Please replace the paragraph beginning at page 13, line 8, with the following redlined paragraph:

Now substituting *N-k* for *k* in the above expression,

$$Z_{N-k} = \sum_{n=0}^{n=N-1} \left(x[n] + jy[n]\right) * e^{j2\pi n(N-k+1/2)/N} \qquad k = 0 \ldots N-1$$

$$= \sum_{n=0}^{n=N-1} \left(x[n] + jy[n]\right) * e^{j2\pi n(-k+1/2)/N} * e^{+j2\pi n}$$

$$= \sum_{n=0}^{n=N-1} \left(x[n] + jy[n]\right) * e^{j2\pi n(-k+1/2)/.}$$

Eq. 19

Please replace the paragraph beginning at page 14, line 1, with the following redlined paragraph:

Using Eq. 18 and 20, separate expressions for G_k and G'_k are required. In a simple case the conjugates in Eq. 18 and 20 should add and subtract to give the required expressions. However in this instance that is not the case. But, substituting *N-k* by *N-k-1* in Eq. ~~18~~ 20, the following is obtained

$$Z^*_{N-k-1} = \sum_{n=0}^{n=N-1} \left(x[n] - jy[n]\right) * e^{j2\pi n(k+1/2)/N} \qquad \text{Eq. 21}$$

Please replace the paragraph beginning at page 14, line 5, with the following redlined paragraph:

Now the term $e^{j2\pi n(k+1/2)/N}$ is common in both Eq. 17 and 19, and it is possible to isolate.

$$Z_k + Z^*_{N-k-1} = \sum_{n=0}^{n=N-1} x[n] * e^{j2\pi n(k+1/2)/N} + j\sum_{n=0}^{n=N-1} y[n] * e^{j2\pi n(k+1/2)/N}$$

$$+\left(\sum_{n=0}^{n=N-1} x[n] * e^{j2\pi n(k+1/2)/N} - j\sum_{n=0}^{n=N-1} y[n] * e^{j2\pi n(k+1/2)/N}\right)$$

$$= 2\sum_{n=0}^{n=N-1}\left(x[n]e^{j\pi n/N}\right) * e^{j2\pi nk/N}$$

$$= 2G_k$$

Please replace the paragraph beginning at page 15, line 1, with the following redlined paragraph:

From the expression from Eq. 22 and 23 into Eq. 16 and 16', below, the MDCT for each channel is obtained.

$$\begin{aligned} Y_k &= \cos\gamma(k)\, 1/2(e^{j\pi(k+½)/N}G'_k + e^{-j\pi(k+½)/N}G'^*_k) \\ &\quad - \sin\gamma(k)\, 1/2j(e^{j\pi(k+½)/N}G'_k - e^{-j\pi(k+½)/N}G'^*_k) \\ &= \cos\gamma * (g'_{k,r}\cos(\pi(k+½)/N) - g'_{k,i}\sin(\pi(k+½)/N)) \\ &\quad - \sin\gamma * (g'_{k,r}\sin(\pi(k+½)/N) + g'_{k,i}\cos(\pi(k+½)/N)) \qquad \text{Eg. 16'} \end{aligned}$$

The overall process is illustrated in Fig. 4.